

1. Summary

AWA 1G8241 12W valve amplifier. S.N. 807.

P.U. Volume and MIC Volume front panel pots. Stepped switch tone control. MIC input with 50 / 200 Ω configuration switch to MIC transformer primary. Rubber grommet isolated mount for 6J7 pentode preamp to MIC volume pot to 6L7, with MIC transformer secondary input and plate feedback. 6J7 triode PU preamp to PU volume pot to 6L7. 6L7's in Barne's phase inverter with fixed biased inputs and common cathode resistor, and screens bootstrapped to PP plates. 6V6 common cathode biased PP stage with screens connected to B+. Tone circuitry connected between 6V6 grids, and between PI screens.

Mains fused both poles. 2 non-synchronous 12V vibrators, with switch-over to use one or the other vibrator, with standby positions to remove 12V to push-pull CT and hence HT supply. 12V heater configuration. 6V indirectly heated diodes. 200 Ω /2k7 Ω fixed humdinger. Three RC supply filters.

Output Transformer	AWA Type 1TJ6997 12W nominal 6.75K Ω PP 6 output winding sections 0, 50 Ω , 150 Ω , 167 Ω , 194 Ω , 250 Ω , 600 Ω .
Power Transformer 1	AWA Type ITK14198. 0-110-220-240V; 335-0-335V @ ?mA ; 12V ?A; 8-0-8V ?A.
MIC Transformer	1TW14012. 50 Ω , 50 Ω , 70k Ω windings. 8-pin octal. Can and earth screen connections.
POTs	IRC. IRC PF5
Resistors	Old dot-style tube; old spray coloured cc; IRC WW 61 15
Caps	Ducon electro can & tube; UCC electro can 35, 35, 35 Ducon wax high seal red 266 AWA black wax with outside foil text and band; Simplex brown mica
Vibrator	V5123 Oak branded AWA; 12V 4A 100Hz non-synchronous 046
Valves	6V6GT x2: Miniwatt 21 TB, Miniwatt 5 QB 6J7 x2: can style KG, can style RCA 59EX9 H5 6K7 x1: can style RCA 8C 278 A K1 H 6L7 x1: can style Philips X5 6X5GT x2: Radiotron 22 GC, Radiotron 22 GC

Good general condition – unrestored, but with at least 2 caps and some resistors changed/added. No top chassis cover. Appears to have been painted. Mostly old dot-style tube resistors. Bent tab style bell-end mounting for OT. Top-cap grid wiring and some other wiring brittle. Likely all 6J7 originally.

Issues: All wiring old and brittle, including transformer lead-ins. Foil caps cracked. Burnt 50 Ω humdinger resistor. 12VAC heater winding only. 450VDC max HT limit from diodes, which may be exceeded for hi mains and no valves. Modified filter caps to give 64 μ F input filter on diodes. Compact layout of valves required metal preamp tubes or tube covers.

2. Measurements

Megger tested 1kV on all PT winding and OT primaries – 1.2G mains to gnd; >2G others.

Primary 242V: DCR = 15+15+3Ω.

Secondary 340-0-340V, DCR = 200+217Ω ; 8.0-0-8.0V ; 13.7V (+9%)

13.7V O/C heater DCR = 280mΩ for ~ 2.0A rating (1.1W).

8.0-0-8.0V O/C vibrator DCR = 670mΩ so likely 1.3A capability (for 1.1W dissipation)

AWA 1TJ6997 output transformer

Winding	Voltage rms	Turns ratio; Impedance for 6.75K pri; Spec level; DCR
Pri P-P:	32.7+32.4	
Sec: F to G tan	19.35	3.35; 601.9Ω; 600Ω; 1000T 14.5Ω
Sec: F to D tan	12.25	5.29; 241.2Ω; 250Ω; 633T 7.3
Sec: F to C dark	10.98	5.90; 193.8Ω; ; 567T 7.2
Sec: F to B tan	10.18	6.37; 166.6Ω; ; 526T 7.1
Sec: F to A red	9.66	6.71; 150Ω; 150Ω; 499T 7.0
Sec: F blk to E tan	5.56	11.65; 49.7Ω; 50Ω; 287T 3.6

Output transformer primary DC resistance: 173Ω + 173Ω

Secondary winding sequence: F to E to A to B to C to D to G. D-G DCR=6.2

6V6 PP with screen= B+=285V indicates 8kPP primary (119% of 6k75).

The winding section between B to D is effective 6.6Ω [7.6Ω], with 11% of secondary turns. An 8 ohm loading presents 8.2k PP.

The winding section between A to D is effective 10.6Ω [12.5Ω].

The winding section between A to E is effective 27Ω [26Ω].

Feedback could be taken from A or E, with B grounded, or alternatively from G, with D grounded.

Input transformer 1TW14012. ES=6; can=3; 50Ω=2-7, DCR=5.3Ω; 50Ω=4-8, DCR=5.3Ω; 70kΩ=1-5, DCR=1k75Ω. 20mVac on either 2-7, or 4-8, generated 730mV on 1-5, and 19.43mV on the other winding, to give a 37.6:1 voltage ratio and 70kΩ output impedance.

3. General comments.

V5123 vibrator: larger pins 1,4 are for reed and coil connections. Smaller pins 2,3 are the primary contacts asynchronously connecting to the reed. Pin 4 is taken to +12V, as well as the push-pull CT tap, and pins 2,3 taken to the push-pull winding end taps on the power transformer. Pin 1 is taken to 0V. Each PP tab has capacitive suppression to 0V. The +12V connection to the CT is switched for standby mode (this removes the HT DC supply, but heaters are still on).

The power supply is typical full-wave rectified type using double diode 6X5GT and a 335-0-335VAC centre-tapped secondary. The effective input resistance of the transformer is about $33\Omega \times (335/240)^2 + 200\Omega = 265\Omega$. 325VAC with 150Ω effective input impedance allows 4uF and 70mA loading per plate, so double diode allows up to 140mA, and possibly a bit more capacitive filtering.

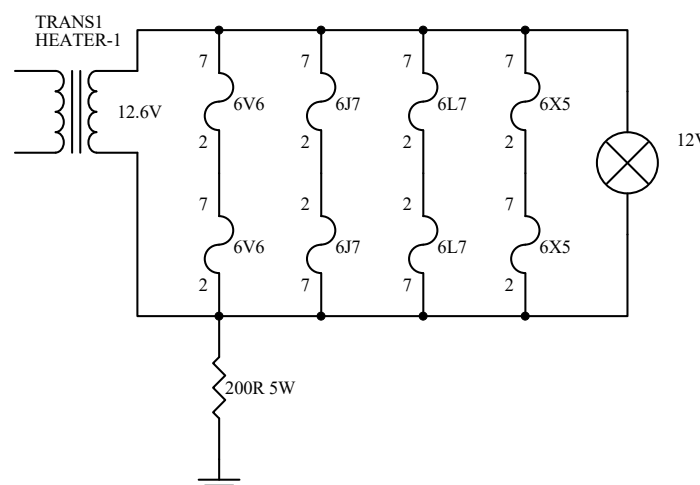
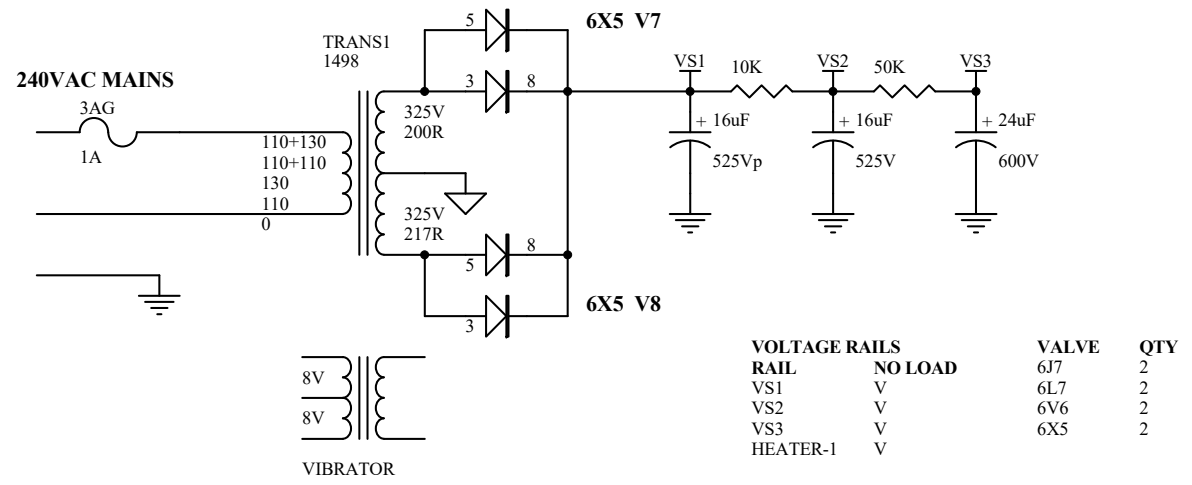
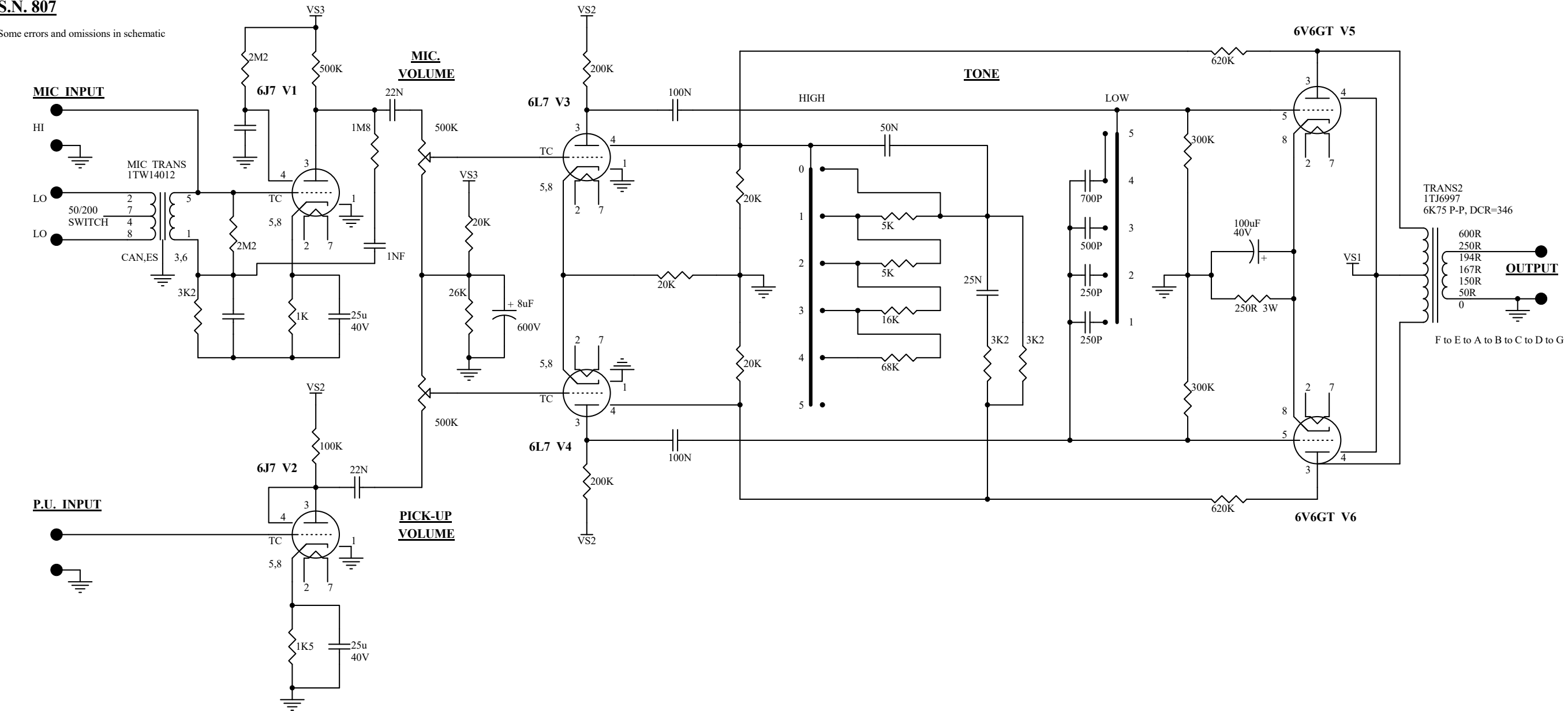
Nominal bias current about 40+40=80mA. PSUD2 indicates VS1 about 380V. Cathode bias about 20V, and another 10V drop. Idle loss about $350 \times 0.04 = 14W$ which is on design centre max. B+ is well above design centre max of 250-285V. Could drop some B+ with additional filtering, although high Rs may suitably sag VS1.

12V heater loading: $0.6 + 0.45 + 2 \times 0.3 + 0.1 = 1.75A$

AWA IG8241 12W PA AMPLIFIER

S.N. 807

Some errors and omissions in schematic



VOLTAGE RAILS		VALVE	QTY
RAIL	NO LOAD	6J7	2
VS1	V	6L7	2
VS2	V	6V6	2
VS3	V	6X5	2
HEATER-1	V		

Title		
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15-Watt AC/Vibrator Amplifier

The circuit diagram on page 47 shows an amplifier system capable of delivering an AF output of 15 watts, which may be operated either from the AC mains or from a 6 volt accumulator. The arrangement, which was brought under notice by reader H. W. M. of Gulgong, NSW, is very similar to the AWA amplifier type 1G3241 which operates from AC mains or from a 12 volt battery. In the original circuit arrangement two vibrator units are provided, a switch being arranged so that the spare vibrator can be quickly switched into circuit should the other fail. The original arrangement also provided for low-impedance microphone input.

This version uses only one vibrator, which can be quickly changed should trouble occur. Two 6X5GT rectifiers are used. The plates in each valve are paralleled and each valve is used as a half-wave rectifier in a full-wave rectifier circuit. It will be seen that the rectifiers operate when the amplifier is being driven either by the AC mains or vibrator supply (6 volts).

The circuit uses a modified "Barnes" push-pull driver arrangement with two input channels, and the output is approximately 15 watts. Somewhat greater output is possible by switching out the negative feedback, which is obtained in rather an ingenious manner by feeding the screens of the push-pull drivers through resistors from the plates of the output valves. These resistors go to the normal HT supply when the feedback is switched out.

Particular note should be taken of the grid and cathode circuit arrangements for the push-pull driver stage. Both valves in this stage are fed independently with signals from the respective input stages and the required out-of-phase voltage for the other driver valve is obtained by the use of the unbypassed common cathode resis-

